

SUPPORT FOR THE AMENDMENT

This Amendment cancels Claims 1-14; and adds new Claims 15-27. Support for the amendments is found in the specification and claims as originally filed. In particular, Claims 15-27 correspond to canceled Claims 1-6 and 8-14, respectively. Additional support for Claim 15 is found in Figs. 1-2. No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 15-27 will be pending in this application. Claim 15 is independent.

REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

The present invention relates to a perpendicular magnetic recording medium including a substrate; an underlayer formed on the substrate; and a magnetic layer formed on the underlayer. The perpendicular magnetic recording medium provides high recording resolution by magnetically isolating magnetic grains in a magnetic film, and has high productivity and high thermal fluctuation resistance. Specification at page 4, lines 8-12. The underlayer makes it possible to reduce the crystal grain size in the magnetic layer and to isolate the crystal grains while the c-axis orientation of the magnetic crystal having the $L1_0$ structure is maintained.

Claims 1-8 and 12-14 are rejected under 35 U.S.C. §102(a), (b) and/or (e) over U.S. Patent Application Publication No. US 2001/0051287 A1 ("Kikitsu"). In addition, Claims 1-3, 5-8 and 11-13 are rejected under 35 U.S.C. §102(a), (b) and/or (e) over U.S. Patent No. 6,599,646 ("Suzuki"). Claims 1-2, 5 and 12-13 are rejected under 35 U.S.C. §102(a) and/or (e) over U.S. Patent Application Publication No. US 2003/0113582 A1 ("Litvinov"). Claims

1-8 and 11-14 are rejected under 35 U.S.C. §103(a) over Kikitsu and further in view of Suzuki. Claims 9-11 are rejected under 35 U.S.C. §103(a) over Kikitsu and further in view of U.S. Patent Application Publication No. US 2004/0191578 A1 ("Chen"). Claims 9-11 are rejected under 35 U.S.C. §103(a) over Kikitsu in view of Suzuki and further in view of Chen. Claims 9-11 are rejected under 35 U.S.C. §103(a) over Kikitsu and further in view of U.S. Patent No. 6,387,483 ("Hokkyo"). Claims 9-11 are rejected under 35 U.S.C. §103(a) over Kikitsu in view of Suzuki and further in view of Hokkyo. Claim 4 is rejected under 35 U.S.C. §103(a) over Suzuki. Claims 9-11 and 14 are rejected under 35 U.S.C. §103(a) over Suzuki and further in view of Chen. Claims 9-11 and 14 are rejected under 35 U.S.C. §103(a) over Suzuki and further in view of Hokkyo. Claims 2-3, 7-8 and 11 are rejected under 35 U.S.C. §103(a) over Litvinov and further in view of Suzuki. Claims 4 and 6 are rejected under 35 U.S.C. §103(a) over Litvinov. Claims 7-10 and 14 are rejected under 35 U.S.C. §103(a) over Litvinov and further in view of Hokkyo.

Regarding Kikitsu, the Office Action asserts:

Kikitsu et al disclose a perpendicular magnetic recording medium (*Paragraph 0085*) comprising a substrate (*Paragraph 0328*), an underlayer formed on the substrate meeting applicants' claimed material limitations (*Paragraph 0328-(Fe₅₅Pt₄₅)Al₁₀*) and a magnetic layer formed on the underlayer meeting applicants' claimed material limitations (*Paragraph 0328-(Fe₅₅Pt₄₅)Cu₁₀*). Office Action at page 3, section 3, lines 3-7 (italics in original).

However, the $(Fe_{55}Pt_{45})Al_{10}$ layer is a magnetic layer including Fe. Kikitsu fails to suggest the independent Claim 15 limitations of "a **nonmagnetic** underlayer formed on the substrate, and containing at least one element selected from the group A consisting of Pt, Pd, Rh, Ag, Au and Ir, and at least one element or compound selected from the group B consisting of C, Ta, Mo, W, Nb, Zr, Hf, V, Mg, Al, Zn, Sn, In, Bi, Pb, Cd, SiO₂, MgO, Al₂O₃, TaC, TiC, TaN, TiN, B₂O₃, ZrO₂, In₂O₃ and SnO₂; and a magnetic layer formed **directly** on the underlayer ...".

Regarding Suzuki, the Office Action asserts:

Suzuki et al disclose a perpendicular magnetic recording medium (*col. 4, lines 56-57*) comprising a substrate (*col. 7, lines 50-53*), an underlayer formed on the substrate meeting applicants' claimed material limitations (*Figure 1D, element 40 and col. 5, lines 51-59: {Pt, Pd, Au or Fe} combined with MgO*) and a magnetic layer formed on the underlayer meeting applicants' claimed material limitations (*element 10'*) and containing crystal grains having a $L1_0$ structure (*col. 4, lines 56-65*). Office Action at page 5, second 4, lines 3-9 (italics in original).

However, Suzuki's underlayer shown in Fig. 1D is not arranged directly under recording layer 10'. Instead, Suzuki's underlayer shown in Fig. 1D is directly under a soft magnetic layer 30. Suzuki fails to suggest the independent Claim 1 limitations of "a ***nonmagnetic*** underlayer formed on the substrate, and containing at least one element selected from the group A consisting of Pt, Pd, Rh, Ag, Au and Ir, and at least one element or compound selected from the group B consisting of C, Ta, Mo, W, Nb, Zr, Hf, V, Mg, Al, Zn, Sn, In, Bi, Pb, Cd, SiO_2 , MgO, Al_2O_3 , TaC, TiC, TaN, TiN, B_2O_3 , ZrO_2 , In_2O_3 and SnO_2 ; and a magnetic layer formed ***directly*** on the underlayer, containing at least one element selected from the group consisting of Fe, Co and Ni, and at least one element selected from the group consisting of Pt, Pd, Au and Ir, and containing crystal grains having an $L1_0$ structure".

Furthermore, Suzuki discloses a magnetic recording medium having an underlayer mainly consisting of an element selected from Cr, Pt, Pd, Au, Fe, Ni, MgO and NiO and a compound thereof under a recording layer 10 (Suzuki at column 5, lines 51-59, and Fig. 12A). However, contrary to the Office Action assertion, Suzuki does not disclose an example which uses an underlayer made of {Pt, Pd, Au or Fe} combined with MgO.

Regarding Litvinov, the Office Action asserts:

Lidvinov et al disclose a perpendicular magnetic recording medium (*Paragraph 0039*) comprising a substrate (*Figure 4, element 10*), an underlayer formed on the substrate meeting applicants' claimed material limitations (*element 40- "FeTaN"*) and a magnetic layer formed on the underlayer meeting applicants' claimed material limitations (*element 30*) and containing crystal grains having an $L1_0$ structure (*Paragraph 0021*). Office Action at page 6, section 5, lines 3-8 (italics in original).

However, FeTaN is a soft magnetic material. Lidvinov fails to suggest the independent Claim 1 limitation of "a *nonmagnetic* underlayer formed on the substrate ...; and a magnetic layer formed *directly* on the underlayer ...".

The secondary references fail to remedy the deficiencies of Kikitsu, Suzuki, and Litvinov. The Office Action cites Chen and Hokkyo for suggesting a crystal orientation layer, seed layer and a protective layer.

Because the cited prior art fails to suggest all the limitations of the claimed invention, the prior art rejections should be withdrawn.

Claim 8 is objected to under 37 C.F.R. §1.75 as being a substantial duplicate of Claim 7. Claim 7 is canceled, so the objection is moot and should be withdraw.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

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